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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/086,125	02/27/2002	Izhak Baharav	10010314-1	2242

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AGILENT TECHNOLOGIES, INC.
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EXAMINER

YAM, STEPHEN K

ART UNIT	PAPER NUMBER
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2878

DATE MAILED: 11/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/086,125	Applicant(s) BAHARAV ET AL.	
	Examiner Stephen Yam	Art Unit 2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 August 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9,13-19,27 and 28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9,13-19,27 and 28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This action is in response to Amendments and remarks filed on August 12, 2004. Claims 1-9, 13-19, and 27-28 are currently pending.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 1-3, 7-9, 12, 14, 15, and 17-19 rejected under 35 U.S.C. 102(b) as being anticipated by Tabei US Patent No. 4,404,586.

Regarding Claim 1, Tabei teaches (see Fig. 2) a digital image sensor, comprising a first (4, 5, 26) two-color photo-detector having a first photo-detector element (26) capable of absorbing light within a first range (4000-4200 Å) (see Fig. 5a) of wavelengths and a second photo-detector element (5) capable of absorbing light within a second range (5500-6000 Å) (see Fig. 5c) of wavelengths, said first photo-detector element being in an elevated relation with said second photo-detector element (see Fig. 2), said first photo-detector element being electrically isolated (41) from said second photo-detector element (see Fig. 5 and Col. 7, lines 64-68), and a second two-color photo-detector (27, 34) having a third photo-detector element (27) capable of absorbing light within a third range (4200-4500 Å) (see Fig. 5a) of wavelengths and a fourth photo-detector element (34) capable of absorbing light within a fourth range (6000-6500 Å) (see Fig. 5c) of wavelengths, said first, second, third, and fourth wavelengths each being different

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from the other, said third photo-detector element being electrically isolated (by (41)) from said fourth photo-detector element (see Fig. 5 and Col. 7, lines 64-68).

Regarding Claims 2 and 15, Tabei teaches (see Fig. 2) a substrate (2), said second photo-detector element being formed within said substrate (see Fig. 5).

Regarding Claim 3, Tabei teaches (see Fig. 5) a dielectric layer (41) between said first photo-detector element and said second photo-detector element, said dielectric layer electrically isolating said first photo-detector element from said second photo-detector element (see Col. 7, lines 64-68).

Regarding Claims 7 and 17, Tabei teaches (see Fig. 4) a color filter (4) (see Col. 6, lines 4-5) in an elevated relation with said first photo-detector element, said color filter absorbing light within a third range of wavelengths and passing light within said first and second ranges of wavelengths (see Fig. 5a-5c).

Regarding Claims 8 and 18, Tabei teaches (see Fig. 5) a transparent metal conductor layer (37) between said color filter and said first photo-detector element (see Col. 8, lines 1-3).

Regarding Claims 9 and 19, Tabei teaches (see Fig. 2) circuitry (6, 9) for driving said first photo-detector element and said second photo-detector element (see Col. 4, lines 56-60), said first photo-detector element being in an elevated relation with said circuitry (see Fig. 2).

Regarding Claim 14, Tabei teaches (see Fig. 2 and 5) a digital image sensor comprising a first two-color photo-detector (4, 5, 26) having a first photo-detector element (26) capable of absorbing light within a first range (4000-4200 Å) (see Fig. 5a) of wavelengths and a second photo-detector element (5) capable of absorbing light within a second range (5500-6000 Å) (see Fig. 5c) of wavelengths, said first photo-detector element being in an elevated relation with said

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second photo-detector element (see Fig. 2), a first dielectric layer (portion of (41) between (5) and (3)) (see Fig. 5) between said first photo-detector element and said second photo-detector element, a second two-color photo-detector (27, 34) having a third photo-detector element (27) capable of absorbing light within a third range (4200-4500 Å) (see Fig. 5a) of wavelengths and a fourth photo-detector element (34) capable of absorbing light within a fourth range (6000-6500 Å) (see Fig. 5c) of wavelengths, said first, second, third, and fourth wavelengths each being different from the other, said third photo-detector element being in an elevated relation (see Fig. 2) with said fourth photo-detector element, and a second dielectric layer (portion of (41) between (34) and (3)) (see Fig. 5) between said third photo-detector element and said fourth photo-detector element.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tabei.

Regarding Claim 13, Tabei teaches the sensor in Claim 12, according to the appropriate paragraph above. Tabei also teaches the first, second, third, and fourth photo-detector elements generating first, second, third, and fourth color values, respectively (see Col. 9, lines 38-50).

Tabei does not teach a third and fourth two-color photo-detector having the same wavelength

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sensitivities as the first two-color photo-detector. It is well known in the art to use multiple photo-detectors in an array to detect an optical image or pattern. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include two additional structures of Tabei placed adjacent to each other, each photo-detector element producing different color values, in the sensor of Tabei, to capture a colored visual image or multi-dimensional pattern by using multiple adjacent detectors in an array.

5. Claims 4-6, 16, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tabei in view of Nozaki et al. US Patent No. 4,677,289.

Regarding Claims 4, 16, 27, and 28, Tabei teaches the sensor in Claims 1 and 14, according to the appropriate paragraph above. Tabei does not teach said first photo-detector element is formed of amorphous silicon having a first thickness selected to absorb light within said first range of wavelengths and said third photo-detector element is formed of amorphous silicon having a second thickness selected to absorb light within a third range of wavelengths. Nozaki et al. teach (see Fig. 4) a similar sensor, with a photo-detector element (42B) formed of amorphous silicon (see Col. 9, lines 7-9) having a thickness selected to absorb light within a desired range of wavelengths (see Col. 9, lines 61-66). It would have been obvious to one of ordinary skill in the art at the time the invention was made to construct the first and third photo-detector elements from amorphous silicon and select a first and second thickness in order to absorb the first and second range of wavelengths, as taught by Nozaki et al., in the sensor of Tabei, to use standard semiconductor construction techniques and materials to produce the sensor, to lower production costs while providing excellent performance.

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Regarding Claims 5 and 6, Tabei teaches the sensor in Claim 1, according to the appropriate paragraph above. Tabei also teaches the second photo-detector element as a photodiode (see Col. 5, lines 49-51). Tabei does not teach the first and second photo-detector elements as PIN photodiodes. Nozaki et al. teach (see Fig. 4) a similar sensor, with a first photo-detector element (42B) in elevated relation to a second photo-detector element (42G), wherein the first and second photodetector elements are PIN photodiodes (see Col. 9, lines 7-9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use PIN photodiodes for the first and second photodetector elements, as taught by Nozaki et al. in the sensor of Tabei, to utilize common photodetector layering while providing respectable detection performance and sensitivity.

Response to Arguments

6. Applicant's arguments filed August 12, 2004 have been fully considered but they are not persuasive.

Applicant argues that Tabei does not teach a third photo-detector element capable of absorbing light within a third range of wavelengths and a fourth photo-detector element capable of absorbing light within a fourth range of wavelengths, with said first, second, third, and fourth range of wavelengths different from the others. Examiner asserts that Applicant's claim language recites the photo-detector elements "capable of" absorbing light within the respective range of wavelengths. As seen in Fig. 5a and 5c, the first and third photo-detector elements are "capable of" absorbing light within first and third ranges of wavelengths, respectively, using any separate

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two wavelength ranges within the photo-conductivity range in Fig. 5a, and similarly, the second and fourth photo-detector elements are "capable of" absorbing light within second and fourth ranges of wavelengths, respectively, using any separate two wavelength ranges within the photo-conductivity range in Fig. 5c. In the above rejection, 4000-4200 Å, 5500-6000 Å, 4200-4500 Å, and 6000-6500 Å are used for the first, second, third, and fourth wavelength ranges, respectively, but any wavelength ranges satisfying the requirements according to Fig. 5a and Fig. 5c can be used to anticipate Claims 1 and 14.

Regarding the Nozaki and Hayward references, Applicant argues that it would be unsatisfactory to modify Nozaki et al. and Hayward et al. to include a second two-color photo-detector that includes third and fourth photo-detector elements capable of absorbing light within third and fourth wavelength ranges, different from the first and second wavelength ranges. Examiner asserts that the rejection specifies the modification of Tabei with the teachings of Nozaki, and not the direct modification of Nozaki or Hayward, since Nozaki and Hayward are used as secondary references in the U.S.C. 103(a) rejections to overcome the deficiencies of Tabei with regards to the claim limitations, specifically the specific stacked structure of Nozaki and the filter arrangement of Hayward.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen Yam whose telephone number is (571)272-2449. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571)272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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THANH X. LUU
PATENT EXAMINER